REMARKS/ARGUMENTS

The Applicant thanks the Examiner for the Office Action dated August 10, 2007.

Claim Rejections - 35 USC § 103

Definition of Page Description

Firstly, turning to the term "page description", the Applicant submits that explicit basis for the definition of the "page description" can be found at page 9, lines 33-35 and page 12, lines 7-11 of the description. Thus, the term "page description" has a clear definition in the description, which is now explicitly replicated in the claims.

The Examiner should note that the definition of the page description demands a description of "a type and zone of the input element". The input element may be, for example, a hyperlink element.

The Applicant and the Examiner are apparently agreed that Dymetman must determine a "pointer-loc" prior to printing. However, Dymetman's "pointer-loc" is not the same thing as the Applicant's "page description". The "pointer-loc" in Dymetman is coordinate information on a page, which is sensed by a pointer, enabling the position of the pointer on the page to be determined. This information alone does not enable Dymetman to interpret the pointer's actions - to do this Dymetman needs an Adobe Acrobat program (see page 398), which must be used in combination with the "pointer-loc".

The Applicant has made no admission that Dymetman determines a description of a type and zone of an input element prior to printing.

Previous Proviso

The purpose of the previous proviso in claim 1 was to exclude subject-matter, which was not intended to be within the scope of the claim.

In view of the Examiner's comments, the proviso has been replaced with a "wherein" clause, specifying that the page description is determined and stored prior to the printing step. Basis for this wherein clause can be found throughout the description: page 45, lines 16-18. It is unambiguously clear from this passage that the "page description" (as defined by page 9, lines 33-35) must be determined and stored before printing.

Arguments Rebutting Dymetman's Alleged Determination of Page Description Prior to Printing

Dymetman *prima facie* describes interpreting user interactions with a printed page via coded data printed thereon. Dymetman proposes coded data identifying a *<page-id, pointer-loc>* pair, the *page-id* being decoded as a network address, the *pointer-loc* being interpreted by a **program** at this address, and providing an action on an output peripheral close to the user (see, for example, the last 4 lines of page 392).

At page 398, 4th full paragraph, Dymetman explains how he proposes to use existing GUI technology in the world of Intelligent Paper. It is clear that Dymetman has not yet worked out how to interpret user interactions when he states that:

> "The approach we are currently investigating is to use the Adobe Acrobat™ suite of products."

Dymetman then goes on to explain what he considers would be a suitable modification of Adobe Exchange to provide a working system.

It is indeed the case that modified Adobe Acrobat™ products provide a tempting starting point for implementing Dymetman's system. However, the Applicant's extensive research has shown that such products are unable to produce a reliable working system, as proposed by Dymetman.

Dymetman's proposal for implementing his system is explained in detail on page 398, the relevant passage of which is reproduced below:

> "In particular, Acrobat Exchange permits one to display documents containing hyperlinks on a screen. These documents can be produced from arbitrary PostScript files and have the same look and disposition on the screen as the printed PostScript documents have on paper. Because of this isomorphism between the screen and the paper version, it is relatively simple to map a position of the paper document into a position on the screen. Pointing actions on the paper can therefore be simulated by virtual mouse actions on the display; every action that the user could have performed on the screen, he can perform on the paper using this simulation."

To make an interactive system operate using Acrobat, it is necessary to use pdfmarks. At the priority date of the present application, pdfmarks were only available in Acrobat Distiller. Although Dymetman does not mention pdfmarks explicitly, nor does he mention Acrobat Distiller, it must be assumed that this is how the person skilled in the art would have implemented Dymetman's proposal.

However, there is a problem relating to clicking on a pdfmark. This problem has been recognized and addressed by the present Applicant, but evidently not by Dymetman. Dymetman implies that a virtual page can be rendered, and that Acrobat will match up a paper click to its intended action. However, Adobe Exchange does not match the mouse click up to an action by itself; the computer windowing system is also involved. Thus, Dymetman's approach would only work if the appropriate section of the page that was clicked on by his pointer was actually shown in a window on the screen. This requires the steps of bringing up a window displaying the document, display the requisite page of that document (and specifically the region of the page containing the paper click), mapping the screen cursor onto that window, and initiating a real cursor click action. Dymetman gives no instructions on how to modify Acrobat or its environment to perform these steps. Since the specific Adobe software code was not made available to the public in 1998, it is submitted that a person skilled in the art would have been unable to achieve the necessary modifications.

However, even if the hypothetical engineer were to solve these software modification problems, a significant difficulty still remains. Dymetman is mistaken when he states that:

> "These documents can be produced from arbitrary PostScript files and have the same look and disposition on the screen as the printed PostScript documents have on paper."

In fact, this is an approximation which is adequate for most applications, but quite inadequate for the application of Netpage or, indeed, Intelligent Paper.

The match between screen and page depends upon text flow. Typically, a pdfmark for a text hyperlink would be attached to the text that is highlighted. As Acrobat calculates the text flow dynamically, this text can wind up in different places, depending on the vagaries of text flow. The text flow of an identical source document can vary from one Acrobat rendering to another, and is affected by at least the following factors:

- Font substitution (Adobe Exchange substitutes a font with a near match if the original font is not available) often changes letterspacing, which can significantly alter word wrap;
- Location of printing or display - *e.g.* US and Europe, where US letter or A4 pages will be automatically assumed, significantly alters word wrap;
- Version of software - subtle changes from one version of Adobe software to another can affect word wrap;
- Kerning - if text kerning is turned on or off, word wrap can change;
- Kerning tables - if the kerning tables of a font are updated, word wrap can change;
- Resolution of rendering - rounding errors at say 400 dpi versus 1600 dpi can cause text to not fit on a line, and change the wrap points;
- Text hinting - this varies with resolution (which typically is vastly different between screen and page) and can affect text wrap;
- Hyphenation settings (*e.g.* how many hyphens are allowed in a row) changes word wrap;
- Hyphenation tables - adding entries to the hyphenation table (positions of allowable hyphens in a word) can change text wrap;
- Widow/Orphan algorithm can change column wrap and page breaks, potentially putting the hyperlink on a different page from the clicked point;
- The justification algorithm used has been improved over time. This changes the balance between letterspacing, word spacing, and hyphenation, and changes word wrap;
- The closeness and algorithm for wrapping text around a picture can affect word wrap;
- Page and column margins can affect word wrap, and can vary according to setting outside the document.

Dymetman makes no mention of this problem of variations in text wrap between renders, and simply assumes that Adobe software has an absolute and unvarying correspondence between subsequent renders of a page in different environments and to different targets.

Adobe's positioning of hyperlinks relative to text flow is the right technical solution for screen based rendering, as it provides flexibility of text flow in different circumstances (screen size, font availability, zoom factor, and so on). This works because there is never a change in any of the above factors between when the text is calculated for on screen display, and when the hyperlink zones are calculated for hit testing. This will typically be only a few seconds apart, and more specifically, any change to any of the above factors would trigger an update re-render of the screen, updating the visual position of the displayed hyperlink, and therefore the position on the screen that a user will click with their mouse. Therefore, Adobe software provides an effective means of storing and rendering interactive documents in a screen based environment, and it is likely this fact that led Dymetman to state "It is

therefore tempting to import as much of the existing GUI technology from the traditional "active display" world to the "passive display" world of Intelligent Paper. The approach that we are currently investigating is to use the Adobe Acrobat™ suite of products."

However, in the case of interactive paper (or Intelligent Paper), there will often be a significant delay between when the page is printed, and when it is clicked on. Also, the computer system that calculated the page, and the computer system that calculates the hyperlink zones for hit testing, will typically be different. As a result, many of the above factors will come into play, and many word wrap positions will be different. It only requires one word wrap difference to completely destroy the position correspondence between intended hyperlink zones in a printed document, and the hyperlink zones that are subsequently calculated for hit testing by re-rendering the page using Acrobat. (Appendix A, attached hereto, demonstrates how word wrap differences in re-rendered documents destroy position correspondence between intended hyperlink zones in a printed document).

As a result, Dymetman's system will have a very high error rate in matching the position on a page of the visual representation of a hyperlink and the position that a user must click on to activate that hyperlink. That is, the user will often miss the hyperlink, and is given no consistent indication of the location of the hyperlink. This will typically get worse with time, as differences between the software versions and computer state between the print time and the click time accumulate.

Furthermore, the page must be rendered and displayed on a screen for a hit test to occur, disrupting the user's computer experience and consuming excess compute cycles.

The failings of Dymetman's teachings lead to doubt as to whether the skilled person would have been able to reproduce a system in accordance with Dymetman's proposal. To this extent, the Applicant submits that Dymetman does not provide an enabling disclosure for the system proposed therein. Indeed, Dymetman readily admits to the fact that his system is merely a proposal and that many aspects of this system requires further maturation (see Section 6 at page 404 of Dymetman). Dymetman's proposal to rely on existing GUI technology is plainly flawed when one considers in detail how such a system would behave in practice.

Moreover, the problems identified by the Applicant in respect of Dymetman are fully overcome by the presently claimed system. In particular, the presently claimed system is distinguished in the following ways:

1. The system stores a page description for a form before the form is printed. This page description describes, *inter alia*, a spatial extent (zone) of an input element of the form, so that hit testing is always done against a representation of the page produced at the time of printing, rather than a re-rendering of the page at the time of hit testing. The difference is subtle but crucial for a reliable and robustly functioning system. In the Applicant's system, the mismatches, which would be an inherent problem of Dymetman's proposed system, are eliminated.

2. Hit testing is done directly against the zone of an input element contained in the page description. There is no requirement to render the page on a screen (or virtual screen), or to display the page in an active window, or to perform virtual mouse-type interactions with the displayed page.

In summary, Dymetman was plainly unaware of the problems involved in implementing his proposed system. Moreover, Dymetman fails to suggest the Applicant's presently claimed solution to these problems. Accordingly, the Applicant submits that the present invention is not obvious in view of Dymetman, either taken alone or in combination with Ur (which has been cited merely for its alleged disclosure of simultaneous printing of user information and coded data, and is not relevant to the Applicant's present line of argument).

It is respectfully submitted that all of the Examiner's objections have been successfully traversed. Accordingly, it is submitted that the application is now in condition for allowance. Reconsideration and allowance of the application is courteously solicited.

Very respectfully,

Applicant/s:

Kia Silverbrook

Paul Lapstun

C/o: Silverbrook Research Pty Ltd
393 Darling Street
Balmain NSW 2041, Australia

Email: kia.silverbrook@silverbrookresearch.com

Telephone: +612 9818 6633

Facsimile: +61 2 9555 7762

APPENDIX A

This document shows some examples of the result when the absolute positions of interactive elements (e.g. hyperlinks) are not stored before printing.

In each case, the document text is the same. While this document is in Microsoft Word, the same kinds of minor differences apply to renderings of documents in versions of Adobe Acrobat that were available in 1999.

The hyperlinked text is marked as such: *Hyperlink*
The position of the click is shown by: 

- Version 1: The original layout – both clicks are registered with the hyperlinks
- Version 2: Typical font substitution: Garamond for Times New Roman
- Version 3: Small change in text wrap around circle
- Version 4: Change in hyphenation. In this case, one of the hylerlinks has moved, but the other is still in place.

The position of the click is in exactly the same place in each case, relative to the sheet of paper. It is the text which moves, based on the subtle effects of minor changes on word wrapping.

The text (by Einstein) is merely an example text, and has no relevance to the issue discussed here.

THE GRAVITATIONAL FIELD
Version 1

"If we pick up a stone and then let it go, why does it fall to the ground?" The usual answer to this question is: "Because it is attracted by the earth." Modern physics formulates the answer rather differently for the following reason. As a result of the more careful study of electromagnetic phenomena, we have come to regard action at a distance as a process impossible without the intervention of some intermediary medium. If, for instance, a magnet attracts a piece of iron, we cannot be content to regard this as meaning that the magnet acts directly on the iron through the intermediate empty space, but we are constrained to imagine -- after the manner of Faraday -- that the magnet always calls into being something physically real in the space around it, that something being what we call a "magnetic field." In its turn this magnetic field operates on the piece of iron, so that the latter strives to move towards the magnet. We shall not discuss here the justification for this incidental conception, which is indeed a somewhat arbitrary one. We shall only *Hyperlink* mention that with its aid electromagnetic phenomena can be theoretically represented much more satisfactorily than without it, and this applies particularly to the transmission of electromagnetic waves. The effects of gravitation also are regarded in an analogous manner.

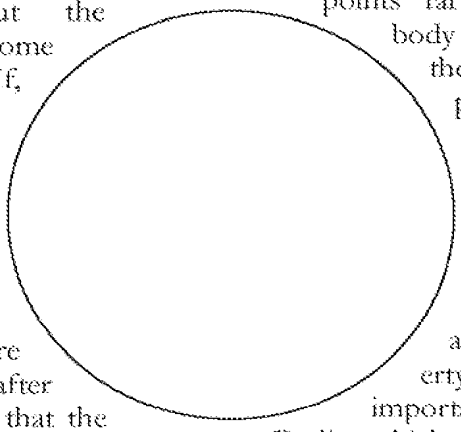
The action of the earth on the stone takes place indirectly. The earth produces in its surrounding a gravitational field, which acts on the stone and produces its motion of fall. As we know from experience, the intensity of the action on a body dimishes according to a quite definite law, as we proceed farther and farther away from the earth. From our point of view this means: The law governing the properties of the gravitational field in space must be a perfectly definite one, in order correctly to represent the diminution of gravitational action with the distance from operative bodies. It is something like this: The body (e.g. the earth) produces a field in its immediate neighbourhood directly; the intensity and direction of the field at points farther removed from the body are thence determined by the law which governs the properties in space of the gravitational fields themselves.

In contrast to electric and magnetic fields, the gravitational field exhibits a most remarkable property, which is of fundamental importance for what follows. Bodies which are moving under the sole influence of a gravitational field receive an acceleration, which does not in the least depend either on the material or on the physical state of the body. For instance, a piece of lead and a piece of wood fall in exactly the same manner in a gravitational field (in vacuo), when they start off from rest or with the same initial velocity. *Hyperlink* This law, which holds most accurately, can be expressed in a different form in the light of the following consideration.

THE GRAVITATIONAL FIELD
Version 2

"If we pick up a stone and then let it go, why does it fall to the ground?" The usual answer to this question is: "Because it is attracted by the earth." Modern physics formulates the answer rather differently for the following reason. As a result of the more careful study of electromagnetic phenomena, we have come to regard action at a distance as a process impossible without the intervention of some intermediary medium. If, for instance, a magnet attracts a piece of iron, we cannot be content to regard this as meaning that the magnet acts directly on the iron through the intermediate empty space, but we are constrained to imagine -- after the manner of Faraday -- that the magnet always calls into being something physically real in the space around it, that something being what we call a "magnetic field." In its turn this magnetic field operates on the piece of iron, so that the latter strives to move towards the magnet. We shall not discuss here the justification for this incidental conception, which is indeed a somewhat arbitrary one. We shall only ***Hyperlink*** mention that with its aid electromagnetic phenomena can be theoretically represented much more satisfactorily than without it, and this applies particularly to the transmission of electromagnetic waves. The effects of gravitation also are regarded in an analogous manner.

The action of the earth on the stone takes place indirectly. The earth produces in its surrounding a gravitational field, which acts on the stone and produces its motion of fall. As we know from experience, the intensity of the action on a body dimishes according to a quite definite law, as we proceed farther and farther away from the earth. From our point of view this means: The law governing the properties of the gravitational field in space must be a perfectly definite one, in order correctly to represent the diminution of gravitational action with the distance from operative bodies. It is something like this: The body (e.g. the earth) produces a field in its immediate neighbourhood directly; the intensity and direction of the field at points farther removed from the body are thence determined by the law which governs the properties in space of the gravitational fields themselves.

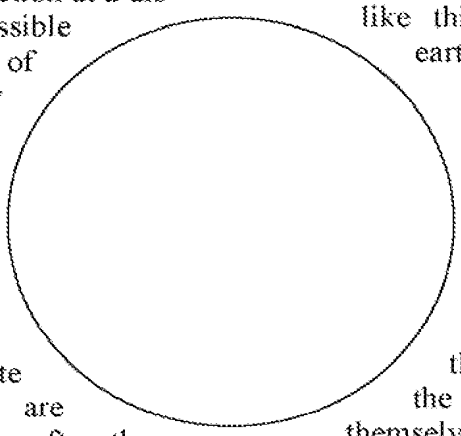


In contrast to electric and magnetic fields, the gravitational field exhibits a most remarkable property, which is of fundamental importance for what follows. Bodies which are moving under the sole influence of a gravitational field receive an acceleration, which does not in the least depend either on the material or on the physical state of the body. For instance, a piece of lead and a piece of wood fall in exactly the same manner in a gravitational field (in vacuo), when they start off from rest or with the same initial velocity. ***Hyperlink*** This law, which holds most accurately, can be expressed in a different form in the light of the following consideration.

THE GRAVITATIONAL FIELD
Version 3

"If we pick up a stone and then let it go, why does it fall to the ground?" The usual answer to this question is: "Because it is attracted by the earth." Modern physics formulates the answer rather differently for the following reason. As a result of the more careful study of electromagnetic phenomena, we have come to regard action at a distance as a process impossible without the intervention of some intermediary medium. If, for instance, a magnet attracts a piece of iron, we cannot be content to regard this as meaning that the magnet acts directly on the iron through the intermediate empty space, but we are constrained to imagine -- after the manner of Faraday -- that the magnet always calls into being something physically real in the space around it, that something being what we call a "magnetic field." In its turn this magnetic field operates on the piece of iron, so that the latter strives to move towards the magnet. We shall not discuss here the justification for this incidental conception, which is indeed a somewhat arbitrary one. We shall only *Hyperlink* mention that with its aid electromagnetic phenomena can be theoretically represented much more satisfactorily than without it, and this applies particularly to the transmission of electromagnetic waves. The effects of gravitation also are regarded in an analogous manner.

The action of the earth on the stone takes place indirectly. The earth produces in its surrounding a gravitational field, which acts on the stone and produces its motion of fall. As we know from experience, the intensity of the action on a body dimishes according to a quite definite law, as we proceed farther and farther away from the earth. From our point of view this means: The law governing the properties of the gravitational field in space must be a perfectly definite one, in order correctly to represent the diminution of gravitational action with the distance from operative bodies. It is something like this: The body (e.g. the earth) produces a field in its immediate neighbourhood directly; the intensity and direction of the field at points farther removed from the body are thence determined by the law which governs the properties in space of the gravitational fields themselves.

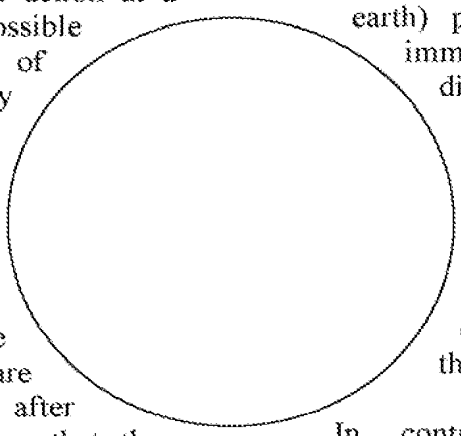


In contrast to electric and magnetic fields, the gravitational field exhibits a most remarkable property, which is of fundamental importance for what follows. Bodies which are moving under the sole influence of a gravitational field receive an acceleration, which does not in the least depend either on the material or on the physical state of the body. For instance, a piece of lead and a piece of wood fall in exactly the same manner in a gravitational field (in vacuo), when they start off from rest or with the same initial velocity. *Hyperlink* This law, which holds most accurately, can be expressed in a different form in the light of the following consideration.

THE GRAVITATIONAL FIELD
Version 4

"If we pick up a stone and then let it go, why does it fall to the ground?" The usual answer to this question is: "Because it is attracted by the earth." Modern physics formulates the answer rather differently for the following reason. As a result of the more careful study of electromagnetic phenomena, we have come to regard action at a distance as a process impossible without the intervention of some intermediary medium. If, for instance, a magnet attracts a piece of iron, we cannot be content to regard this as meaning that the magnet acts directly on the iron through the intermediate empty space, but we are constrained to imagine -- after the manner of Faraday -- that the magnet always calls into being something physically real in the space around it, that something being what we call a "magnetic field." In its turn this magnetic field operates on the piece of iron, so that the latter strives to move towards the magnet. We shall not discuss here the justification for this incidental conception, which is indeed a somewhat arbitrary one. We shall only *Hyperlink* mention that with its aid electromagnetic phenomena can be theoretically represented much more satisfactorily than without it, and this applies particularly to the transmission of electromagnetic waves. The effects of gravitation also are regarded in an analogous manner.

The action of the earth on the stone takes place indirectly. The earth produces in its surrounding a gravitational field, which acts on the stone and produces its motion of fall.



As we know from experience, the intensity of the action on a body dimishes according to a quite definite law, as we proceed farther and farther away from the earth. From our point of view this means: The law governing the properties of the gravitational field in space must be a perfectly definite one, in order correctly to represent the diminution of gravitational action with the distance from operative bodies. It is something like this: The body (e.g. the earth) produces a field in its immediate neighbourhood directly; the intensity and direction of the field at points farther removed from the body are thence determined by the law which governs the properties in space of the gravitational fields themselves.

In contrast to electric and magnetic fields, the gravitational field exhibits a most remarkable property, which is of fundamental importance for what follows. Bodies which are moving under the sole influence of a gravitational field receive an acceleration, which does not in the least depend either on the material or on the physical state of the body. For instance, a piece of lead and a piece of wood fall in exactly the same manner in a gravitational field (in vacuo), when they start off from rest or with the same initial velocity. *Hyperlink* This law, which holds most accurately, can be expressed in a different form in the light of the following consideration.